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INTERNATIONAL INFLATIONARY LINKAGES
AND THE RECENT EXPERIENCE
IN INDIVIDUAL COUNTRIES

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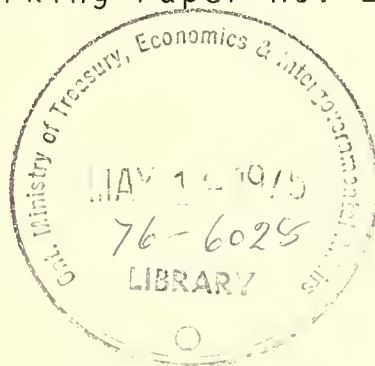


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Introduction

The analysis of economic events is fraught with difficulties. With hindsight it is possible to attribute causes to the great depression of the 1930's, the post-war inflation and similar events, but at the time interpretation is difficult because of short-run preoccupations, unreliable statistics and a body of popular economic and political thought that almost always relates to past situations. The present world inflation is another example. Academic economists had become aware of the international aspects of inflation under a fixed exchange rate system, but this knowledge was only assimilated and passed on to policy makers after exchange-rate movements had become commonplace. Policy makers themselves have contributed to our current difficulties by failing to discriminate between real and nominal magnitudes. Many econometric models used for policy simulations also failed to make such a distinction particularly for interest rates. As well, most of our statistics were constructed during periods of relative price stability and many of these can be misleading when applied in inflationary situations.

The purpose of this paper is limited to providing a statistical background to enable events and theories concerning inflation as an international phenomenon to be placed in their proper perspective. All too often widely held views or theories are incompatible with actual economic developments or the timing of the acceleration of inflation itself. By following such an approach, the range of possible explanations can be narrowed. Since politicians are fond of saying that inflation is caused abroad by events outside their control it is hoped that this exercise will prove useful. The format is as follows. The first section discusses the dispersion of inflation rates while the second examines recent exchange-rate developments to determine the applicability of alternative theories. This is followed by an analysis of monetary developments, trade prices, demand, exchange rate regimes and the relevance of the boom in commodity prices.

Some Arithmetic

One of the interesting aspects of inflation on a world scale is the difference among countries. In a previous paper, I noted how the coefficient of variation of inflation rates in industrial countries has been declining over a long period.¹ Since the coefficient of variation is the ratio of the standard deviation to the mean, the implicit idea behind its use was that a given nominal distribution of inflation rates represents less of a dispersion at higher average rates. If complete arbitrage among national prices via the mechanism of international trade flows is possible, the standard deviation would be the more appropriate statistic. Since the measure or meaning of the dispersion of inflation rates is not obvious, more detail will be given here. Table 1A contains the relevant data by year, while Table 1B points out the highest and lowest movements in GNP deflators and the countries involved as well as the mean and the range between the highest and lowest figures.

Clearly the coefficient of variation shows a decline in the dispersion² while the standard deviation shows only a very slight decline. Some economists have noted that the standard deviation of inflation rates has not declined lately and have suggested that a sharp decline probably occurred with the postwar return to currency convertibility in 1958. Aside from the aberrant year of 1958 itself the data do not support this view. Perhaps the most interesting aspect of these statistics is the wide range of inflation rates that existed under the fixed exchange rate system. Various countries were often several standard deviations from the mean, and the average range of inflation rates in the 1960's was six percent. Of the 18 years shown, Ireland and Finland had the highest rates of inflation on four occasions. On the low side, the United States had the best performance for 5 of the 18 years whereas they had the lowest rate in eleven cases.

Table IA
Mean and Dispersion of GNP Deflator
in 17 OECD Countries(1)

	<u>Mean</u>	<u>Standard deviation</u>	<u>Coefficient of variation</u>
1956	4.55	1.75	0.38
1957	3.98	1.55	0.39
1958	2.84	3.22	1.13
1959	2.02	1.47	0.73
1960	2.57	1.31	0.51
1961	3.05	1.55	0.51
1962	3.59	1.64	0.46
1963	3.98	1.84	0.46
1964	4.63	2.08	0.45
1965	4.37	1.33	0.30
1966	4.25	1.23	0.29
1967	3.67	1.06	0.29
1968	3.76	2.04	0.54
1969	4.53	1.55	0.34
1970	6.11	2.04	0.33
1971	6.68	1.70	0.25
1972	6.51	1.70	0.26
1973	6.41	1.47	0.23

(1) Canada, United States, Japan, Australia, Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Norway, Sweden, Switzerland, United Kingdom.



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Table 1B

Highest, Lowest and Mean Rates of
Inflation in OECD Countries

	<u>Highest</u>		<u>Mean</u>		<u>Lowest</u>	<u>Range High-Low</u>
1956	9.1	Finland	4.6	1.3	Switzerland	7.8
1957	7.4	Finland	4.0	1.2	Denmark	6.2
1958	12.0	France	2.8	-1.6	Norway	13.6
1959	6.2	France	2.0	-0.3	Italy	6.5
1960	5.0	Sweden/ Japan	2.6	0.5	Ireland	4.5
1961	6.8	Japan	3.0	0.7	Canada	6.1
1962	6.7	Denmark	3.6	1.2	Belgium/ United States	5.5
1963	8.6	Italy	4.0	1.3	United States	7.3
1964	9.4	Ireland	4.6	2.6	Australia/ Canada	6.8
1965	5.9	Netherlands	4.4	1.9	United States	4.0
1966	7.1	Denmark	4.3	2.1	Italy	5.0
1967	5.6	Finland	3.7	1.2	Germany	4.4
1968	10.7	Finland	3.8	1.5	Italy	9.2
1969	8.4	Ireland	4.5	2.9	Sweden/ Switzerland	5.5
1970	11.5	Norway	6.1	3.2	Finland	8.3
1971	10.7	Ireland	6.7	3.2	Canada	7.5
1972	11.0	Ireland	6.5	3.2	United States	7.8
1973	12.5	Australia	6.4	5.3	United States	7.2

One final point on the dispersion issue. The fact that inflation rates should be similar across countries under a fixed exchange rate system is often compared with the situation in an individual country (which has to have fixed exchange rates among regions). It is asserted that within a country prices must be equalized. To test this latter theory, inflation rates for ten cities in Canada were subjected to the same analysis as for countries. The resulting data are given in Tables 2A and 2B. Although the coefficient of variation does decline in a similar manner, it is less than the same statistic for the industrialized countries. As well, the average standard deviations for the first and last five-year periods for the Canadian cities are virtually identical. The spread between high and low rates is quite small in absolute terms, when compared with the earlier statistics and this explains to some extent how some cities switch frequently from having the highest to the lowest rates and vice versa.³

One final issue of arithmetic concerns the timing and strength of the acceleration in prices. It can be seen from Table 3 that the acceleration began in 1968, although the pace differed between areas. In the (enlarged) EEC the rate of inflation indicated by the GNP deflator went from 2.6 per cent in 1967 to 3.0 in 1968 and then to 5.2 in 1969, while in the United States the progression was less rapid from 3.1 per cent in 1967 to 3.7 in 1968 and then to 4.9 per cent in 1969.

Table 2A

Mean and Dispersion of Regional
Inflation Rates in Canada

	<u>Mean rate(1)</u>	<u>Standard deviation</u>	<u>Coefficient of variation</u>
1950	3.34	0.65	0.195
1951	10.48	0.95	0.091
1952	1.74	0.77	0.443
1953	-1.14	0.58	0.509
1954	0.89	0.25	0.281
1955	0.53	0.43	0.811
1956	1.37	0.46	0.336
1957	2.91	0.44	0.151
1958	2.46	0.32	0.130
1959	1.33	0.69	0.519
1960	1.08	0.20	0.185
1961	0.90	0.32	0.356
1962	1.06	0.36	0.340
1963	1.41	0.40	0.284
1964	1.12	0.46	0.411
1965	1.84	0.33	0.179
1966	3.06	0.62	0.203
1967	3.16	0.59	0.187
1968	4.03	0.41	0.102
1969	3.77	0.51	0.135
1970	2.89	0.67	0.232
1971	1.88	0.67	0.359
1972	4.09	0.37	0.090
1973	6.91	0.64	0.093

(1) St. John's (Nfld), Halifax, St. John, Montreal, Ottawa, Toronto, Winnipeg, Saskatoon, Edmonton, Vancouver.

Table 2B

High and Low Rates in Canada
with their Location

	<u>Highest rate</u>		<u>Mean</u>		<u>Lowest rate</u>	<u>Range High-Low</u>
1950	4.1	Toronto	3.3	2.2	Halifax	1.9
1951	12.0	Montreal	10.5	9.3	Saskatoon/ Edmonton	2.7
1952	3.0	St. John	1.7	1.0	Saskatoon	2.0
1953	0.2	Saskatoon	-1.1	-1.8	Halifax/ St. John	2.0
1954	1.3	Toronto	0.9	0.4	Montreal	0.9
1955	1.4	St. John's	0.5	-0.2	Edmonton	1.6
1956	2.5	St. John's	1.4	0.9	St. John	1.6
1957	3.8	Toronto	2.9	2.4	St. John's/ Winnipeg	1.4
1958	3.1	Montreal	2.5	1.9	Ottawa	1.2
1959	2.5	Halifax	1.3	0.2	Toronto	2.3
1960	1.5	Winnipeg	1.1	0.8	Montreal	0.7
1961	1.5	Winnipeg	0.9	0.3	Vancouver	1.2
1962	1.7	Saskatoon	1.1	0.3	Vancouver	1.4
1963	2.0	St. John's	1.4	0.8	Saskatoon	1.2
1964	1.7	Toronto	1.1	0.4	Halifax	1.3
1965	2.5	Toronto	1.8	1.5	St. John's/St. John/ Edmonton	1.0
1966	4.4	Toronto	3.1	2.4	St. John's/ Vancouver	2.0
1967	4.0	Edmonton	3.2	2.3	Halifax	1.7
1968	4.5	St. John's	4.0	3.4	Montreal	1.1
1969	4.6	Halifax	3.8	2.9	St. John's	1.7
1970	4.1	Halifax	2.9	1.9	St. John's	2.2
1971	2.6	Ottawa	1.9	1.0	Saskatoon	1.6
1972	4.1	Ottawa/ Toronto	4.1	3.7	Halifax	0.4
1973	8.2	St. John's	6.9	5.8	Saskatoon	2.4

Table 3

Time Path of Inflation Rates in Industrial Countries

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
<u>OECD area</u>														
GNP deflator	2.3	2.4	2.6	2.9	2.9	3.4	3.3	3.2	3.5	4.8	5.9	5.7	5.8	7.6
CPI	1.9	1.9	2.5	2.8	2.4	3.1	3.4	3.0	3.9	4.8	5.6	5.3	4.7	7.7
<u>United States</u>														
GNP deflator	1.7	1.2	1.2	1.3	1.7	1.9	2.8	3.1	3.7	4.9	5.5	4.7	3.2	5.4
CPI	1.6	1.1	1.2	1.2	1.3	1.7	2.9	2.8	4.2	5.4	5.9	4.3	3.3	6.2
<u>EEC (9)</u>														
GNP deflator	2.2	3.4	4.3	4.5	4.1	3.9	3.6	2.6	3.0	5.2	6.5	7.1	6.4	7.7
CPI	2.0	2.6	3.9	4.0	3.6	3.8	3.4	2.5	3.1	4.4	5.0	6.2	6.2	8.3

Exchange Rate Flexibility and
Alternative Theories of International Inflation

There are many aspects and theories of the international transmission of inflation although they are often specific to one exchange rate regime. Consequently knowledge of the prevailing exchange rate system is a precondition for any proper analytic discussion. Although it is obvious that exchange rates presently vary substantially, it is less obvious when the fixed rate regime ceased. Formally, a generalized period of floating began in February 1973 after the second dollar devaluation, however, considerable flexibility existed from the time of the U.S. decision to make the dollar inconvertible on 15th August, 1971. Going further back in time, the number and frequency of exchange-rate changes seemed to increase after the devaluation of the pound sterling in late 1967. Table 4 contains indices of effective exchange rates, where the weights have been calculated using the multilateral trade model of the IMF.⁴ It can be seen that substantial flexibility did exist from 1967 but that movements in the 1970's were much more dramatic. Surprisingly, there was a substantial amount of variability shown in the first few years of the table (1959 to 1961).⁵ This was the period just after the return to currency convertibility in Europe.⁶

The most widely discussed monetary theory of the international transmission of inflation assumes that under a fixed exchange-rate system the balance-of-payments deficits of the United States, as a key currency country, spill over into the reserve bases and ultimately the money supplies of the surplus countries. In this framework the issuance of SDR's provides an increase in international money which promotes inflation. Under flexible exchange rates countries are free to determine independent monetary policies. If countries' policy makers abuse this freedom the world money supply could grow excessively. The pressure of demand can also transmit inflation under a fixed exchange rate either directly or via the monetary implications of changes in trade balances.

Table 4
Percentage Changes in Effective Exchange Rates from 1970 First Quarter

	<u>1958</u>	<u>1959</u>	<u>1960</u>	<u>1961</u>	<u>1962</u>	<u>1963</u>	<u>1964</u>	<u>1965</u>	<u>1966</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>
Canada	7.6	9.7	9.2	4.4	-1.0	-2.0	-2.0	-1.9	-1.8	-1.8	-0.2	-0.1	2.7	5.2	3.8	-1.3
United States	-9.4	-7.7	-5.4	-3.7	-2.5	-2.2	-2.1	-2.1	-2.0	-1.7	0.3	0.4	-0.7	-3.3	-9.3	-16.1
Japan	-6.4	-5.1	-3.7	-3.2	-2.8	-2.8	-2.9	-2.8	-3.0	-2.7	-0.6	0.2	-0.4	1.5	12.2	18.6
Austria	-4.9	-2.9	-1.8	-1.8	-1.5	-1.5	-1.5	-1.4	-1.3	-1.0	1.2	1.2	-0.2	0.7	1.9	8.3
Belgium	-6.7	-3.0	-1.6	-2.4	-2.5	-2.7	-2.5	-2.1	-2.3	-2.0	-0.9	-0.7	-0.4	-0.5	2.2	2.8
France	27.2	10.9	13.1	12.8	12.8	12.8	12.8	12.9	12.7	12.7	14.2	9.1	0.1	-2.1	-0.1	2.0
Germany	-20.9	-17.9	-16.1	-12.4	-11.9	-11.5	-11.2	-11.7	-11.7	-11.1	-9.3	-7.1	1.0	4.0	6.6	17.0
Italy	-7.1	-2.9	-0.8	-0.5	-0.6	-0.7	-1.2	-1.2	-1.0	-0.8	1.0	0.9	0.1	-0.7	-1.8	-12.1
Netherlands	-8.6	-5.7	-4.3	-1.3	-0.5	-0.5	-0.7	-0.4	-0.8	-0.2	1.4	1.6	0.1	1.1	2.4	5.0
Switzerland	-7.5	-5.5	-3.3	-3.0	-3.2	-3.1	-3.0	-3.1	-3.0	-2.7	-0.1	0.3	-0.4	2.3	3.5	13.8
United Kingdom	7.7	10.3	13.1	13.7	14.1	13.9	13.6	13.8	13.8	12.0	-0.5	-0.3	-0.5	-0.5	-4.2	-14.1

The role of the prices of internationally traded goods in transmitting inflation seems clear. Domestic price effects can come from the prices of imported goods which are not produced domestically and from changes in the prices of goods which compete with domestic goods which may or may not be traded. Scandinavian theorists have developed a model of external inflationary linkages by dividing economies into "exposed" and "sheltered" sectors. A sector is exposed if it sells its production abroad or if it competes domestically against foreign firms. The sheltered sector is assumed to have little competition and would include the public sector and the service sector. The local currency prices of the exposed sector are determined by world market prices and the exchange rate, while prices in the sheltered sector depend upon costs and a desire to maintain some given level of profits. Consequently, if world prices or the exchange rate alter, wages in the exposed sector will be altered in the short to medium term. These wage changes will spread to the sheltered sector and, given the lower level of productivity growth, will lead to price increases in this sector. This theoretical framework can adapt to either exchange rate regime.

Finally, there are a number of theories which relate world inflation to sociological factors concerning income distribution or extravagant expectations. These do not consider the relevance of alternative exchange rate regimes. Since such theories seem ill-suited to the simultaneous worldwide nature of inflation they will not be pursued here.

Monetary Aspects

The simplest monetary theory of world inflation relates the acceleration of prices to United States balance of payments deficits and the fact that under a fixed exchange rate system these would cause increases in the money supplies of surplus countries. It is easy to discount this theory by noting that 1968 and 1969 were years of United States surpluses on the balance on official settlements. This is not an adequate refutation of the theory for two reasons. First, neither the balance on official settlements

nor the liquidity version is the most appropriate measure for a key currency country. The following table shows both the balance on official settlements and the balance on non-monetary transactions. Clearly the theory cannot be refuted on the grounds of a balance of payments surplus if a more appropriate definition of the balance is used. The second reason why this simple theory cannot be so easily denied is the existence of lags in the mechanism whereby balance of payments surpluses affect money supplies and money supplies affect prices. The monetary effect of surpluses can be sterilised in some countries in the short run although not in the longer run.

Table 5

Alternative Definitions of the United States		
<u>Balance of Payments</u>		
<u>Year</u>	<u>Balance on Official Settlements</u>	<u>Balance on Non- Monetary Transactions</u>
	(Millions of dollars)	
1965	-854	-1310
1966	-108	-2408
1967	-2972	-3714
1968	1508	-2197
1969	2827	-4964
1970	-10949	-3587
1971	-30694	-21635
1972	-11187	-13726
1973	-5574	-4957

Source: OECD

Given that the basic requirements exist for this theory it is largely an empirical matter to examine the portfolio behaviour of national monetary authorities. In a study of the period from 1950 to 1966 Michaely has shown that deficit countries generally embarked upon a policy of tight money while surplus countries eased monetary conditions [10]. In the years since that study it would appear that countries have been less willing to allow their monetary policy to be decided abroad. In many cases the sterilisation of large surpluses would be quite difficult because of the thinness

of domestic money markets. Some countries have tried to sterilize surpluses but have found that in the face of sustained balance of payments disequilibrium and international capital mobility that this was impossible. Nonetheless as I pointed out in an earlier paper the growth in the money supply of non-U.S. OECD countries did not accelerate until 1971. From 1965 to 1970 for example the average annual rate of increase was about $12\frac{1}{2}$ per cent, whereas in 1971 it jumped to $17\frac{1}{2}$ per cent. As can be seen from Table 5 1971 was the year of peak U.S. deficits but by this time exchange rates were beginning to perform some of the adjustments. In any event the recorded growth in domestic monetary aggregates in the context of sterilisation is only part of the story, and one for which we have little empirical knowledge.⁷

Portfolio decisions of central bankers are now much more complicated than simply buying or selling gold and dollars. Deposits are held with other central banks, in Euro-dollars and in United States Treasury bills. Shifts in a portfolio with an unchanged balance of payments can produce quite different monetary impacts. One of the most dramatic was the pyramiding of initial surpluses when redeposited by central banks in the Euro-dollar market by the BIS. Pyramiding in the Euro-dollar market will only end when leakages occur from Euro-dollars into the official reserves of a central bank that would acquire direct claims on the United States. These matters have been discussed in much more detail elsewhere so suffice it to link this development with inflation. The following table gives some indication of the size of the Euro-currency market since 1964. In 1968 the 27 billion dollar size of the Euro-currency market compares with the money supply of Germany which was 22 billion dollars, or France at 44 billion or the United Kingdom at 37.⁸ This was a major increase in liquidity to supplement the domestic money supplies, and the timing would not be inconsistent with the rise in the world rate of inflation. Unfortunately there is virtually no empirical work linking the growth of the Euro dollar market to domestic non-financial variables.

Table 6
Size and Growth of the Euro-currency Market
(billion U.S. dollars)

<u>Year</u>	<u>Size</u>	<u>Growth Rate (per cent)</u>
1964	9	-
1965	12	33
1966	15	25
1967	18	20
1968	27	50
1969	44	63
1970	57	30
1971	70	23
1972	92	31
1973 ^e	130	41

e: estimated

A related monetary issue concerns the role of special drawing rights. These have been issued three times: on 1st January, 1970, 3,414.3 million, on 1st January, 1971, 2,949.2 million, and finally on 1st January, 1972, for 2,951.5 million, for a total of 9,315 million. The current value of an SDR is approximately 1.2 U.S. dollars. Compared with domestic money creation and the growth of the Euro dollar market, there does not appear to have been a great inflationary stimulus in the amounts issued, although it is true that they added to world money at a time when this was not desirable. Using a very simple model, Neumann has recently shown that changing SDR's for dollars at a fixed price does not alter domestic money supplies whereas the financing of deficits with SDR's would allow the rate of inflation to rise, but would not have caused the inflation. [11] Given the awareness of the misguided rate of money creation in recent years, it seems unlikely that more SDR's will be issued in the near to medium term, thereby defusing this topic.

One direct test of the simple global monetary thesis is possible. A world price equation is derived in the monetary approach to the balance of payments which assumes that inflation is generated by the creation of domestic and international money; here, current income is the principal argument in the demand for money equation.⁹

The theory would suggest that the world rate of inflation should be given by the following equation:

$$\hat{p} = \sum_i w_i r_i G_{R_i} + \sum_i w_i (1-r_i) G_{D_i} - \sum_i w_i \eta_y G_{y_i}, \quad (1)$$

where:

- \hat{p} is the predicted world rate of inflation,
- w_i is country i's share in the world money stock,
- r_i is the ratio of country i's official reserves to the domestic money supply,
- η_{yi} is the income elasticity of the demand for real cash balances,
- G refers to the growth rate, while
- R_i is the official reserves of country i,
- D_i domestic credit in country i, and
- y_i is real income in country i.

This is, of course, a long run model and no allowance is made for sterilisation or other such short run phenonema which would cause the true rate to diverge from the predicted rate. This model was used to generate a predicted rate of inflation for the seven largest OECD countries which was then compared to the actual rate as in the following table.

Table 7
Actual and Predicted Rates of Inflation
from the Monetarist Model

<u>Year</u>	<u>1</u>	
	<u>Actual</u>	<u>Predicted</u>
1961	2.4	4.6
1962	2.5	7.7
1963	2.6	8.0
1964	2.6	6.3
1965	3.1	9.5
1966	3.0	5.7
1967	3.0	9.6
1968	3.4	9.5
1969	4.9	5.6
1970	5.9	8.6
1971	5.4	17.7
1972	4.5	12.9

1. U.S., Japan, Canada, France, Germany, Italy and the United Kingdom, weighted by GNP

The predicted values are always much higher than the actual, although the signs of the changes are similar until 1967.¹⁰ Both progressed upwards from 1961 to 1963 but the decline in the predicted value for 1964 was only matched by a constant actual level.¹¹ Both moved sharply ahead in 1965 and declined in 1966. After 1970 the assumption of a fixed exchange rate is not valid so that consistent results would not be expected. In general this test refutes the very simple monetarist model upon which it is based. The lack of expectations, financial markets and lags in adjustment would bias such a simple approach yet such an approach to world inflation has often been advanced.

Under fixed exchange rates, interest sensitive capital flows undermine the effectiveness of monetary policy. With a flexible exchange rate easy monetary policy affects demand by reducing interest rates and increasing the availability of funds as well as by reducing capital inflows or encouraging an outflow and depreciating the exchange rate. The latter effect depends of course on relative monetary conditions. The greater the interest elasticity of capital flows the greater the extent to which monetary policy works on prices via capital flows, the exchange rate and, with some lag, the trade balance. The inelasticity of expectations of exchange rate changes is also of importance in determining the result of a given change in monetary policy. As the sensitivity of capital flows to movements in the exchange rate approaches infinity the aggregate demand effects of monetary and fiscal policy approach the fixed exchange rate situation as speculators are simply replacing the exchange stabilization authorities. Consequently endogenous capital flows can be incorporated into the analysis of the inflationary process via the effects of changes in aggregate demand.

Under floating exchange rates, greater national autonomy in monetary policy is possible. It is therefore possible for rates of money creation to exist which would otherwise have produced a balance of payments crisis and domestic deflation. Table 8 contains growth rates of money supplies for a number of industrialized countries since 1970. These generally very high rates can be compared with rates of approximately one-half this level in the 1960's.

Table 8
Growth Rates of Money Supplies
in Selected Industrial Countries

	<u>1971</u> <u>1970</u>	<u>1972</u> <u>1971</u>	<u>1973</u> <u>1972</u>	<u>1974 Q1</u> <u>1973 Q1</u>
Austria ¹	15.9	17.1	12.1	11.2
Belgium ¹	12.3	16.9	13.0	14.3
France ¹	18.2	18.6	15.0	
Germany ¹	16.2	15.8	13.3	11.1
Italy ²	18.6	24.5	17.8	
Netherlands ¹	10.2	8.5	22.0	
Switzerland	39.5	4.2	-1.4	
United Kingdom ¹	13.0	27.8	27.3	
Australia ¹	8.7	19.7	21.0	18.7
Canada ¹	18.1	14.6	16.5	16.7
Japan ¹	24.3	24.7	16.8	15.1
United States ¹	13.3	13.0	8.6	8.5
Average ³	15.64	16.47	12.72	

1 M1 plus quasi money

2 M1 only

3 Weighted by 1970 GNP's and exchange rates

Source: Main Economic Indicators, OECD.

While this does not prove that money creation caused the inflation, governments certainly allowed their central banks to produce a volume of money which financed the inflation. The freedom of the exchange rate to vary meant that this development was unimpeded by the discipline which the balance-of-payments constraint would otherwise have imposed. Alternatively some governments used monetary policy to fix the flexible exchange rate, thereby, for example, increasing the money supply to keep the exchange rate from rising in order to keep exports "competitive." Case studies on the roles played by monetary authorities of deficit and surplus countries in recent years would likely be informative.

Trade Prices

A number of writers have accented the role of traded goods prices in the acceleration of world inflation. For example, after surveying a large number of theories Nordhaus concluded:

The wage inflation in the United States and Canada can be attributed to the tightness of labour markets. Outside of North America the rise in wages can be more tenably ascribed to the permissive economic climate generated by a rise in import prices.¹²

Table 9 contains percentage changes in import and export average values in local currencies as well as in the gross barter terms of trade from 1967 to 1973. This is supplemented by an index of trade weighted foreign trade prices for OECD countries from 1965 in Table 10 which also includes the non-U.S. OECD GNP deflator, weighted by GNP weights.¹³

Table 9
Percentage Changes in Export and Import
Average Values and Terms of Trade
(in local currencies)

		<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>
Canada	Imports	0.1	2.4	2.3	2.0	1.6	3.1	6.8
	Exports	3.0	2.5	2.5	2.5	-0.1	2.9	10.8
	Terms of trade	3.0	0.1	0.2	0.6	-1.7	-0.2	3.8
United States	Imports	0.9	1.2	3.5	6.6	5.2	7.4	18.8
	Exports	1.6	1.3	3.8	5.3	3.3	2.8	16.7
	Terms of trade	0.7	0.1	0.3	-1.2	-1.8	-4.3	- 1.8
Japan	Imports	-0.3	-1.4	0.0	4.2	1.8	-7.5	12.4
	Exports	3.1	0.1	4.5	5.6	0.4	-1.8	8.4
	Terms of trade	3.4	1.5	4.5	1.3	-1.4	6.1	- 3.6
Austria	Imports	-1.7	-4.1	1.2	10.2	4.2	-0.5	3.3
	Exports	-0.1	-4.0	0.7	7.0	0.4	-0.9	3.0
	Terms of trade	1.6	0.1	-0.5	-2.9	-3.7	-0.4	- 0.3
Belgium	Imports	-2.0	0.3	3.1	3.8	1.6	-0.9	..
	Exports	-0.4	-1.2	4.7	4.7	-2.8	1.5	..
	Terms of trade	1.6	-1.4	1.5	0.9	-4.3	2.5	..
France	Imports	-0.5	-2.2	6.5	10.8	3.5	0.9	7.8
	Exports	-0.7	-0.7	7.3	10.4	5.7	1.1	10.0
	Terms of trade	-0.3	1.6	0.8	-0.4	2.2	0.1	2.0
Germany	Imports	-1.2	-2.3	2.3	-2.0	-1.1	-1.9	4.9
	Exports	-0.9	-1.5	1.8	1.8	1.6	0.9	1.6
	Terms of trade	0.3	0.8	-0.5	3.8	2.8	2.9	- 3.2
Italy	Imports	1.0	0.7	0.9	4.2	7.7	1.4	21.0(a)
	Exports	0.4	-0.2	3.3	5.1	6.4	1.6	11.3(a)
	Terms of trade	-0.5	-0.9	2.4	0.9	-1.1	0.2	- 7.7(a)
Netherlands	Imports	-1.0	-2.9	3.0	6.8	4.7	-0.9	6.6(a)
	Exports	0.0	-1.9	2.0	3.8	1.9	0.9	5.6(a)
	Terms of trade	1.0	1.0	-1.0	-2.8	-2.7	1.9	-0.8(a)
United Kingdom	Imports	0.1	11.2	4.1	4.7	4.6	3.9	28.4
	Exports	1.4	8.0	3.4	6.9	5.6	5.2	12.5
	Terms of trade	1.3	-2.9	-0.7	2.1	1.0	1.2	-12.4

Source: Main Economic Indicators, OECD

(a) First three quarters

Table 10
Percentage Changes in OECD Foreign Trade Prices
and non-U.S. GNP Deflators in Local Currency

	<u>1965</u>	<u>1966</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>
Foreign Trade Prices	1.1	1.6	0.2	1.1	3.2	4.0	2.9	1.0	10.0
GNP deflator	4.4	4.2	3.3	3.3	4.7	6.3	6.6	6.6	9.6

As can be seen the acceleration in foreign trade prices began in 1969 or perhaps in 1968 while the acceleration in GNP deflators began in 1969. In 1968 the countries which devalued late in 1967 began to experience sharp increases in both export and import prices.¹⁴ The remaining countries generally experienced lower export prices perhaps because of competition with countries which devalued. Many of the remaining countries also experienced a drop in import prices because of their effective revaluations. This was a period of substantial demand pressure with most OECD countries operating at a high level of demand. In 1969 substantial trade price increases followed the revaluation of the DM as Germany was operating above the potential rate of GNP growth and export prices in DM continued to rise. In 1967 and 1968 German export average values had declined in local currency. Since Germany had been a restraining force in terms of price on world markets, and in many respects a price leader, when other countries priced up to the much higher German export prices in foreign currencies, still further increases in traded goods prices resulted. Although further exchange rate changes occurred in 1971 and 1972 foreign trade price increases decelerated in aggregate even though the rate of (non-U.S.) world inflation moved up. In 1973 the prices of traded goods accelerated, led by the very sharp increases in commodity prices as well as export prices in many OECD countries. Even for countries with effective revaluations increases in import prices were substantial. (The oil price increases of late 1973 would not be reflected to any great extent in the average value statistics for 1973.)

There are a number of ways of analyzing the impact of foreign trade prices on domestic prices. The most obvious impact occurs via the direct effect on import prices. This is often (incorrectly) assumed to be the totality of imported inflation. The potential mechanical impact of import price changes, that is excluding input-output effects, can be measured with varying degrees of accuracy. Table 11 provides a rough measure for a selected group of industrial countries. This has been calculated by measuring the ratio of the change in import average values in local currency weighted by the share of imports in GNP to the percentage change in the consumer price index.¹⁵ This statistic is therefore a percentage of the rise in consumer prices that actually occurred and obviously abstracts from exogenous influences and, for example, the effects of demand or varying profit margins. The magnitude of the imported inflation element in 1973 is immediately apparent, although the extent varies with the effective exchange rate change and the product composition of imports. The table also shows that the effect was significant in earlier years even when raw material prices were declining. This was the case in 1970 and 1971.

Table 11
Potential "Mechanical" Contributions of
Import Average Value Changes¹ to the Rise²
in Consumer Prices

	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>
Canada	+1	+12	+11	+13	+11	+14	+13
United States	+2	+ 2	+ 4	+ 6	+ 7	+13	+17
Japan	-1	- 3	0	+ 5	+ 3	-16	+10
Austria	-13	-45	+12	+72	+28	- 2	+13
Belgium	-29	+ 5	+34	+40	+15	- 7	+47
France	-3	- 8	+16	+33	+10	+ 2	+17
Germany	-17	-31	+17	-11	- 4	- 7	+14
Italy	+6	+ 9	+ 7	+16	+30	+ 5	+46
Netherlands	-15	-38	+19	+75	+30	- 6	+49
United Kingdom	+1	+52	+17	+16	+11	+12	+67

1 In local currencies

2 A positive (negative) sign indicates a price increasing (decreasing) effect of an increase (decrease) in import average values.

A question of more importance is the extent to which exchange rate changes could have influenced domestic price performance. Therefore the above exercise was recalculated replacing the change in the import average value with the change in the effective exchange rate.

The results of this exercise are given in Table 12. In the case of revaluing countries the indicated mechanical contribution would assume that prices are not sticky downwards. What is surprising is that this mechanical effect in most countries in most periods could hardly account for much of a change in consumer prices. Various devaluations such as the U.K. and France have provided exceptions in particular years as has the continued strength of the DM. Still the exchange rate effects would average much less than one percentage point of the annual increase in the CPI and even the sharp exchange rate changes would rarely amount to much more than two percentage points. Consequently as the average rate of world inflation moves higher the mechanical impact of exchange rate changes (particularly revaluations) becomes less.

The above statistics have been concerned with the potential mechanical impact of import price or exchange rate changes. In reality several further effects can be noted. One positive effect of revaluation is to cut into the profits of exporting firms, thereby reducing their ability to grant large wage increases. Any direct impact of a revaluation on consumer prices would also reduce wage demands. Furthermore the cheapening of imports and potential imports in local currency after a revaluation will tend to keep down prices for import substitutes. On the other hand the greater the instability of trade prices the less incentive there is for importers to pass on declines in their costs since this situation could be reversed at their expense, particularly where a price control regime is in operation.

Table 12

Potential "Mechanical" Contributions of
Exchange Rate Changes to the Rise in
Consumer Prices ¹

	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>
Canada	0	-8	0	-18	-17	+6	+13
United States	-1	-3	0	+1	+3	+11	+7
Japan	0	-4	-1	+1	-3	-23	-5
Austria	-2	-24	0	+10	-7	-6	-26
Belgium	-6	-15	-2	-4	+1	-21	-4
France	0	-5	+11	+25	+6	-5	-5
Germany	-9	-27	-19	-46	-12	-9	-28
Italy	-1	-25	+1	+3	+3	+4	+1
Netherlands	-11	-21	-1	+16	-6	-8	-15
United Kingdom	+14	+52	-1	+1	0	+12	+24

1 A positive (negative) sign indicates a price increasing (decreasing) effect of a depreciation (appreciation).

One theory that has been in vogue in recent years, particularly in some small European countries, has evolved from Scandinavian experience and relates to the role of export prices. In this model the economy is broken down into "sheltered" and "exposed" sectors where the exposed sectors have their prices determined on world markets. ¹⁶ The sheltered sector is assumed to be largely the service sector and the government sector, both of which are assumed to operate with less competition and with a lower trend growth rate of productivity than the exposed sector. Wage changes are assumed to be equalized throughout the economy. Increases in export prices will increase wages generally and cause an increase in the rate of inflation since the rate of productivity growth is lower in the sheltered sector. Devaluations will be inflationary in this model since they increase profits in exposed sectors, but so will inflation abroad or a fluctuating level of world trade prices. One of the difficulties with this model is that it contains only a price-wage sector without consideration of aggregate demand or monetary relationships. A further difficulty is that all causes of inflation

are exogenous and all the model does is transfer the price rises. In empirical terms the movement of trade prices in the context of this model is not enough to account for the recent levels and acceleration of inflation.

A number of writers have accented the central role of the United States in the development of rising world trade prices, since this country alone did not have to worry about the effect of its prices on the balance of payments. Even the sheer size of the economy is of considerable importance in terms of the volume of world transactions. In terms of GNP the United States would consist of about 45 per cent of the OECD total (at 1970 exchange rates), whereas in terms of trade the U.S. weight is about 25 per cent. The timing of U.S. trade price changes is consistent with the rise in the non-U.S. OECD GNP deflator in 1969 but this was also a time when European economies were running at capacity or above potential output so that it would be difficult to blame U.S. prices without more information. As I pointed out in an earlier paper the United States weight in many European countries imports and exports is relatively small. Furthermore the rise in German export prices played a key role in European inflation. Still the weight of the U.S. is important in aggregate and the timing is consistent so that some influence must be accorded to this explanation.

Demand Pressures

The mechanism of the transmission of inflation via the pressures of demand is quite straightforward and overlaps with the monetary mechanism as trade surpluses or deficits alter the domestic monetary base. On a bi-country basis this mechanism would generally seem insufficient to explain the synchronous rapid acceleration of world prices. On the other hand the influence of a rapidly growing world money supply could encourage such a development. Indeed the world business cycle expansion from 1972 through mid-1973 was one of the few occasions when all major countries were expanding together and mutually reinforcing the pressure of demand. One important

study investigating inflation at the world level found precisely that "the world inflation take-off in the late 1960's was caused (in proximate terms) by the excess demand pressures in the aggregate world economy."¹⁷ Not only is excess demand necessary but there is a feedback from prices to demand. Laidler has shown that the initial effect of a rise in the world rate of inflation could be contractionary since the resulting increase in the demand for cash balances would go ahead of the supply.¹⁸ However in the longer run, excess demand must exist to bring domestic prices up to the world level via the process of balance of payments imbalances.

In the mid-1960's the industrialized countries began to operate their economies at close to potential output. In 1967-1968 these countries were operating at or even above their potential. This was when world inflation began to accelerate. A number of European countries, notably France and Germany, maintained this level of output, although the rate of capacity utilization declined in the United States, Japan and Italy. Through this period of cooling off the rate of inflation climbed well above that of 1969 in 1970 and did not decelerate much in 1971. The world boom in 1972 and 1973 led to a rapid increase in the rate of inflation. If account is taken of the development of inflationary expectations the failure of the rate of inflation to decline in 1970 is not surprising and the pressure of demand hypothesis stands up well to recent history.

The International Monetary System

The reform of the international monetary system is of fundamental importance to world economic stability and welfare. Curiously, both fixed and flexible exchange rates are considered to be inflationary by various groups. Dr. Emminger of the German Bundesbank is a leading exponent of the view that the fixed exchange-rate system was inflationary. He has stated that the Bretton Woods system broke down "because the limit of tolerance for the inflationary effect of currency inflows had been reached."¹⁹ Others would

argue that exchange-rate changes are irrelevant because of the domestic adjustments which occur to produce the appropriate real rather than nominal prices, wages, etc., which offset the effect of the exchange-rate change. They argue that the lack of downward price flexibility produces an inflationary bias in the flexible exchange-rate system. Prices rise in the devaluing country because of the higher cost of imports in local currency, but if prices are not flexible downwards the revaluing country does not get an equivalent improvement in its rate of inflation. Consequently, any exchange-rate change is inflationary on balance. Given the fact that world inflation began to accelerate in the late 1960's, after the pound sterling and a number of other currencies were devalued, increased even further at the time of the Smithsonian adjustments and soared after the move to a system of floating exchange rates in February 1973, the timing at least accords with the theory. The theory also accents the fact that with floating exchange rates, the monetary authorities are able to follow an independent monetary policy which, in the case of excessive money creation, allows the higher average price level resulting from exchange-rate changes to be financed as well as promoting inflation directly. The statistics presented above indicate that the rate of money creation began to accelerate in 1971.

One aspect of floating exchange rates that has not attracted much attention is that without the need to intervene in foreign exchange markets the demand for international liquidity must fall drastically. Given that the supply has been increasing, these funds will likely find their way into other uses. This further suggests the need for a proper portfolio choice model of the international financial system.

Furthermore, the way exchange rates are changed can have an important effect upon the rate of inflation in the world. This is partly a question of the burden of adjustment, whether surplus or deficit nations should undertake exchange-rate changes. The problem is that the continuation of adjustments in one direction increases the number of exchange-rate changes ultimately needed since this places

more pressure on countries that were initially in a balanced position.²⁰ If prices are inflexible in a downwards direction minimizing the number of exchange-rate changes would minimize the inflationary impact. The effect of delaying a required revaluation can also be inflationary. Willett has pointed out how a consequent reduction in demand with sticky wages and prices may cause governments to expand which would increase the prevailing rate of inflation.²¹ This then is an argument for more flexibility and against an adjustable peg mechanism.

Superficially, it is tempting to agree with the theory of the inflationary bias of flexible exchange rates. We do have many prices which are inflexible downwards and inflation did accelerate when exchange-rate changes became more frequent. On the other hand, the period since 1967 has been one of higher than average capacity utilization and demand pressures, and it is difficult to separate these factors from the exchange-rate and inflation story. Furthermore, any inflationary bias in exchange-rate flexibility must be traded off against the liquidity influences on domestic money supplies under a fixed system. As well, it is an open point whether the balance of payments should itself be a constraint on domestic policy making, that is, exchange-rate adjustments should be the mechanism used to restore equilibrium. In any event it would not be the system which is responsible but the use that is made of it.

Some small amounts of evidence do exist. For raw materials, where the large number of producers and consumers guarantee the existence of competition there has been a clear indication of the inverse relationship between changes in raw material import prices and exchange rate changes. However, for imports as a whole the inverse relationship only holds for periods of low demand pressure.²² In periods such as June 1972 to June 1973 with a high level of demand pressure asymmetrical behaviour did exist, that is devaluing countries experienced a notable increase in import prices, whereas there was no comparable favourable impact on import prices in revaluing countries. On the question of the optimum number and direction of exchange-rate changes, the pivoting of parity changes around the dollar would have resulted in the minimum or near minimum adjustment from 1961 to 1971.²³

Commodity Prices and the Price of Gold

The sharp increase in commodity prices during the current inflation was a symptom rather than a cause of inflation. The world business cycle and lags in investment behaviour can explain some of the increase in commodity prices but not all. Historically commodity prices and industrial output have moved closely together, yet spot commodity prices rose by 12 per cent from August 1973 to March 1974 although there was no difference in the index of industrial production for OECD countries. While inflation accelerated gold and commodity prices rose together. Not only can this be seen from a cursory examination of the aggregate data, but it prevailed in individual commodity markets. For example, a recent report stated that "cocoa followed gold up and down on the London market every trading day of the month except two."²⁴ It appeared that commodities generally as well as gold were purchased as a hedge against currency uncertainties in terms of both inflation and exchange rate changes.

Econometric analysis supports the above hypothesis. First difference equations were estimated to explain the change in commodity prices in order to avoid problems arising from time trends. Other equations showed that the autoregressive nature of commodity prices was such that a first difference form was warranted. The first difference equation using a three month difference was²⁵

$$\Delta P_{\text{Comm}} = 3.75 + 0.53 \Delta P_{\text{Gold}}, \quad \bar{R}^2 = 0.37 \quad (2)$$

(3.13) (6.64)

As would be expected from a difference equation the \bar{R}^2 was not high, but the \bar{R}^2 -statistic (shown in brackets) on the coefficient on the change in the gold price was significant at the 0.005 level.

The reason why commodity price movements should be treated largely as a symptom rather than a cause of inflation is easy to see. Gold has traditionally been the asset to acquire when confidence has been lost in paper currencies. The decision to acquire gold must be made on the basis of the risk and return. As the price of gold rises, the risk attached to buying an extra unit rises as well as that attached to the existing stock held. Since the price in, for example, March of 1974 was five times the price of gold in mid 1970, the risk of a decline and capital loss must have been considered carefully by those purchasing additional quantities. Hence, even at much lower prices, as the price of gold rose it became a more risky investment and the acquisition of commodities provided diversification. One important element in diversification is the reduction in risk because of the fact that prospects for alternative assets are not contingent on the same events. Industrial commodity prices are clearly influenced by the underlying economic activity and would seem to provide a reasonable degree of covariance with the gold price. The theory of speculation spilling over into commodities would require local peaks in gold prices to occur before similar peaks in commodity prices. This pattern has held since 1972 with a perceptible but varying lag of commodity prices behind the gold price. The local troughs in commodity prices have not been matched to the same extent.

One factor was clearly the lack of confidence in the international monetary system. The price of gold began to move up from a level of just over 40 dollars an ounce after the Smithsonian realignment of December 1971 and increased slowly through 1972. Although commodity prices also moved up over this period, the rate of increase was not dramatic. Both gold and commodity prices began to accelerate in January 1973 after the turmoil began in exchange markets. In January the Swiss franc was floated, while in February the dollar was devalued and the yen and lira floated. From January to February, the gold price rose by 29 per cent, while spot commodity prices rose by 9 per cent. As the turmoil increased with currency markets closed in March, the Deutschmark was revalued

and a number of European currencies participated in a joint float. Later in the year, the DM was revalued again as was the Dutch guilder. When the Middle East war erupted and the energy crisis was seen to have a major effect on current balances of the industrial countries, the floating currencies changed their rates of exchange quite suddenly. Given these uncertainties, the flight into gold and the acquisition of commodities as either a hedge or a speculation was not surprising.

Domestic inflation rates in industrial countries also played a role in encouraging gold and commodity purchases. Since paper currency was depreciating rapidly in real value, commodities provided a useful store of value. Equations were estimated relating the spot prices of commodities to the rate of inflation and the Eurodollar rate, with all variables in natural logarithms:

$$\begin{aligned} \ln P_{\text{COMM}} = & \frac{2.0}{(19.3)} + \frac{0.56}{(17.3)} \ln P_{\text{GOLD}} & (3) \\ & - \frac{0.02}{(0.5)} \ln \text{EURO\$} + \frac{0.34}{(6.0)} \ln \dot{P}, \quad \bar{R}^2 = 0.95 \end{aligned}$$

where EURO\$ is the three-month Eurodollar interest rate and \dot{P} is the weighted OECD consumer price index. Given the functional form the relationship of the rate of inflation to the spot price of commodities is quite strong. The relationship has held over shorter periods. For example, as the monthly rate of inflation in industrial countries went from less than 1 per cent per month late in 1973 to 1.5 per cent in February both the price of gold and the prices of commodities continued to rise. When the rate declined to a monthly rate of just over 1 per cent, both gold and commodity prices also declined.

While the underlying rationale for the commodity price boom seems reasonable enough, the exchange rate uncertainties and high rates of inflation had to be caused by some economic forces and furthermore had to be financed. On both counts recent monetary policies in industrialized countries seem to have fed the "inflation" as discussed earlier. One further complication of the monetary role in the gold and commodity price increases concerns the effect of real interest rates. Even though nominal interest rates rose rapidly with the rate of inflation, theory suggests that real rates will adjust only partially because of the interest rate induced wealth effect and because of the lags in the adjustment of price expectations.

Consequently, in the disequilibrium situation which prevailed, it often paid to borrow and purchase gold, commodities and other real assets. The rapid monetary creation kept down nominal rates, hence real rates were negative in many countries. It is interesting, but perhaps only a coincidence, that the decline in spot commodity prices as well as the gold price began early in 1974 only after Eurodollar interest rates had risen substantially. In equation (3) the sign on the interest rate term is correct but it is not statistically significant. This is not discouraging because the equation itself is a simple one and there would have been an a priori presumption that the correlation of interest rates with inflation and commodity prices would have led to a positive rather than the required negative sign.

Clearly, commodity prices and gold prices moved closely together over a period characterized by monetary uncertainty and hence this link contributed to domestic rates of inflation. Although special circumstances helped to encourage inflation and exchange-rate hedging as well as speculation, domestic and international monetary developments were primarily responsible. It is therefore not completely true to state that the recent inflation was caused by exogenous forces.

Final Comments

Although some monetarists have laid claim to the acceleration of world inflation in the late 1960's under the operative mechanism of balance of payments surpluses accumulating under a fixed exchange rate system, greater importance could probably be attached to the role of money creation after 1970 (or perhaps 1967) as central bankers felt less constrained by the balance of payments in managing their domestic economies. Although the early 1970's was a period of record U.S. deficits, the fixed exchange rate system had begun to break down. The growth of money stocks in many if not all industrialized countries was at an extremely high rate in the 1970-1973 period. Increased flexibility would seem to give finance ministers

and central bankers more wild oats to sow, yet restricting flexibility would act against balance of payments adjustment and the achievement of the proper policy mix. There exists some optimum pattern of exchange rate changes that would minimize the world amount of necessary adjustment, yet given different national tolerances for inflation and/or exchange rate variations the optimum is unlikely to be reached.

Trade prices decelerated sharply in 1971 and 1972 even though there was only a levelling off at best in the world rate of inflation. Although expectations could play a role in this development the differences between domestic and international trade prices suggests that some further consideration should be given to the micro-economics of inflationary processes. The economics of information and search costs suggest that those holding stocks of goods in short supply acquire monopoly privileges to set prices since further searching will reduce the probability of stocks being left. Yet during the 1971 and early 1972 period there were no major shortages or bottlenecks. Demand pressure alone was clearly not sufficient to produce the recent development in inflation, although the recognition of inflationary expectations makes the role of demand quite significant in a number of studies. The overheating of almost all industrial countries from mid-1972 to 1973 suggests that the simultaneously reinforcing feedbacks among countries were not fully appreciated in formulating national macroeconomic policies. Although this gave a stimulus to commodity prices, their sharp rise was more a symptom than a cause of inflation, contrary to popular political opinion.

FOOTNOTES

Most of the research for this paper was prepared at the OECD where the statistical work was conducted by A. Angelopoulos. The helpful comments of the discussants and participants at the Conference on "Bank Credit, Money and Inflation in Open Economies" were appreciated, as was the financial assistance of the Katholieke Universiteit te Leuven in permitting me to attend the Conference. Grant Reuber also read and gave useful advice on this paper. Needless to say all responsibility rests with the author.

1. See [15].
2. For example, the mean standard deviation for the most recent 5 years is 1.69 against 1.86 for the first five years. Assar Lindbeck has argued with me that even this decline disappears if extreme values are removed. In my own view that would remove what one is trying to look for in these statistics.
3. Genburg [5] has shown that on average inflation rates have not differed more between countries than between U.S. cities.
4. Source: O.E.C.D.
5. In 1960 only one of the countries shown had a negative change in the effective exchange rate. This strange pattern can be attributed to the large devaluations of Iceland, Spain and Turkey which are not shown.
6. Since this paper is concerned with inflation it is worth noting in passing that the average rate of inflation was higher over the three years preceding this period. The average change in the consumer price index for the OECD area was 1.9 per cent from 1959 to 1961 whereas it was 3.3 per cent from 1956 to 1958.
7. As Argy and Kouri [1] have pointed out it is not sufficient simply to regress the change in the money supply or domestic credit against the change in reserves or net foreign assets. A negative coefficient could mean either neutralisation or the offsetting of monetary policy by the change in foreign assets.
8. Converted to dollars at 1968 exchange rates. Source: OECD, Main Economic Indicators.
9. For complete details see H. G. Johnson [7].
10. Small variations in these results could be obtained by changing the 'actual' rate used from the GNP deflator to the consumer price index (although the GNP deflator is probably more appropriate) or by increasing the existing coverage from 87 per cent of the industrialized world.
11. This could be explained by inflationary expectations.

12. See W. D. Nordhaus [12], p. 459.
13. The U.S. is excluded since its weight is dominant.
14. This is also true of Spain, which devalued, but which is not included in these statistics.
15. Since GNP does not include imports the national accounting basis for this approximation is not exactly correct, but any error is likely to be less than ten per cent.
16. For some references to this literature see Pattison [15] or Edgren, Faxen and Odhner [3].
17. See Duck, Parkin, Rose and Zis [2].
18. See Laidler [8], pp. 12, 13.
19. See his Per Jacobsson lecture [4], p. 2 (Emminger's italics.)
20. E. S. Howle [6].
21. T. D. Willett [16].
22. Some evidence is given in [13] pp. 25-29. This result has been further substantiated in cross-section studies with a larger number of countries.
23. Howle, [6], p. 928.
24. G. McNair [9].
25. The data used in this section comes from the following sources:
Commodity prices are taken from the Economist dollar index. The gold price in U.S. dollars is taken for the end of each month from the Bank of England Quarterly Bulletin. The three-month Eurodollar rate is for Euro-dollar deposits and is taken from the end of each month. The source is Morgan Guaranty Trust, World Financial Markets. Consumer price indices are from the OECD. The monthly observations run from January 1968 to April 1974.

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